

Screening-Level Modeling Analysis of the Potomac River Power Plant Located in
Alexandria, Virginia

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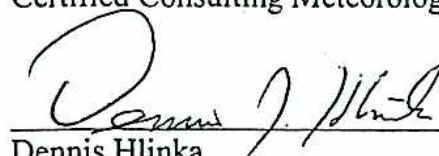
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Dated



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1.0 Introduction

The Potomac River power plant in Alexandria, VA has very low stacks for a coal-fired facility, which apparently was deemed necessary because it is located along the flight path for Washington National Airport. One potential consequence of concern for low stacks is the direct impaction of the plumes into nearby high-rise residential areas during periods with moderate to strong wind speeds. Unlike typical dilution of pollutants emitted from a stack from the point of release to touch down at the surface, plume impaction for elevated receptors presents a special condition that can create substantially higher air quality impacts. Residents in the vicinity of the Potomac River power plant in Alexandria, Virginia have indeed expressed a concern about the potential localized air pollution impacts. Sullivan Environmental Consulting, Inc. (Sullivan Environmental) conducted an air quality screening analysis of localized impacts using the nearby Marina Towers condominium complex as an example.

As can be noted in Figure 1, the power plant is located about 300 feet (90 meters) south of the southern tip of the Marina Towers complex. The Marina Towers condo building is a 14-story (140 feet high (42.7 meters)) building in the shape of a "Y". Figure 2 presents a picture of the west-northwest facing sides of the condominium complex. This report summarizes the air quality screening model analysis of the power plant emissions and the maximum predicted ambient air concentrations in area the condominium complex.

1. Relative Location of the Marina Towers Condominium Complex to the
Potomac River Power Plant in Alexandria, Virginia

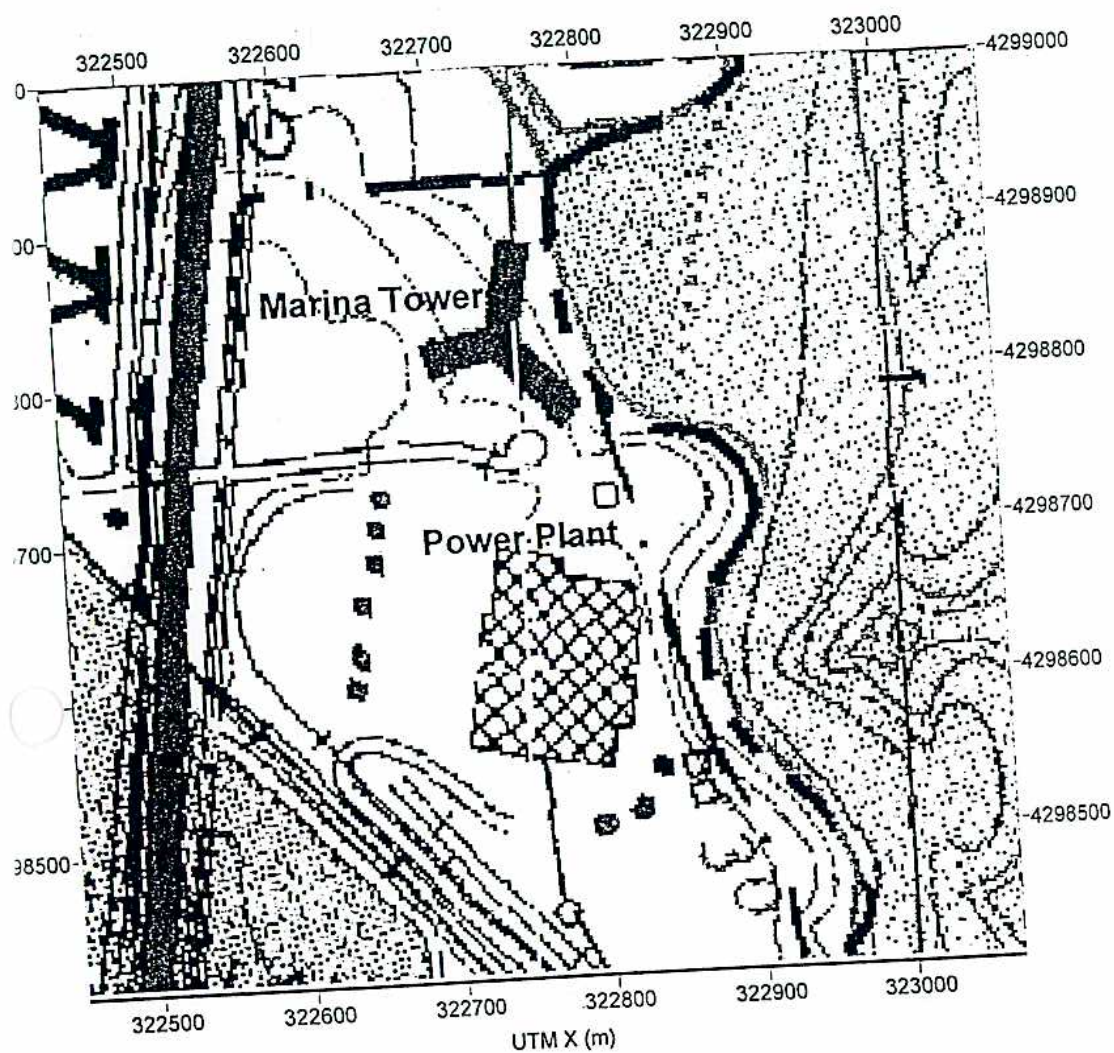
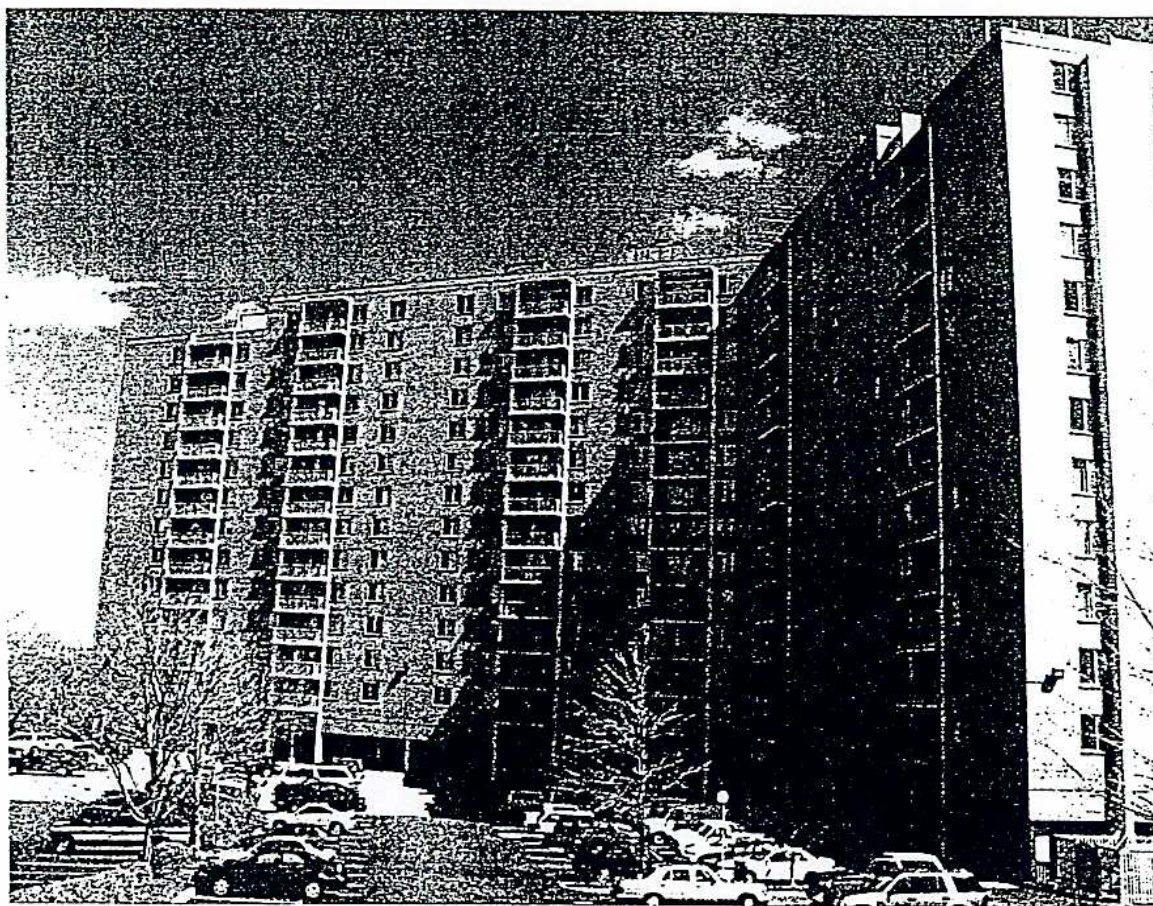


Figure 2. The 14-Story Tall Marina Towers Condominium Complex
(looking east).



ion Modeling Analysis

Based on 2003 data obtained from the Virginia Department of the Environmental (VA DEQ), the Potomac River power plant building is about 116 feet (35.4) tall with five short stacks extending on a north-south line across the top of the re (see Figure 3). The stacks are about 45 feet (13.7 meters) above the roof of the ig. The building width (south and north sides) is 315 feet (96 meters) while the ig length (west and east sides) is 390 feet (119 meters). The modeled stack eters of the five emission stacks, from the VA DEQ, are provided in Table 1.

**Figure 3. The Potomac River Power Plant (looking west-northwest).
Marina Towers complex is located to the right and behind the power plant]**

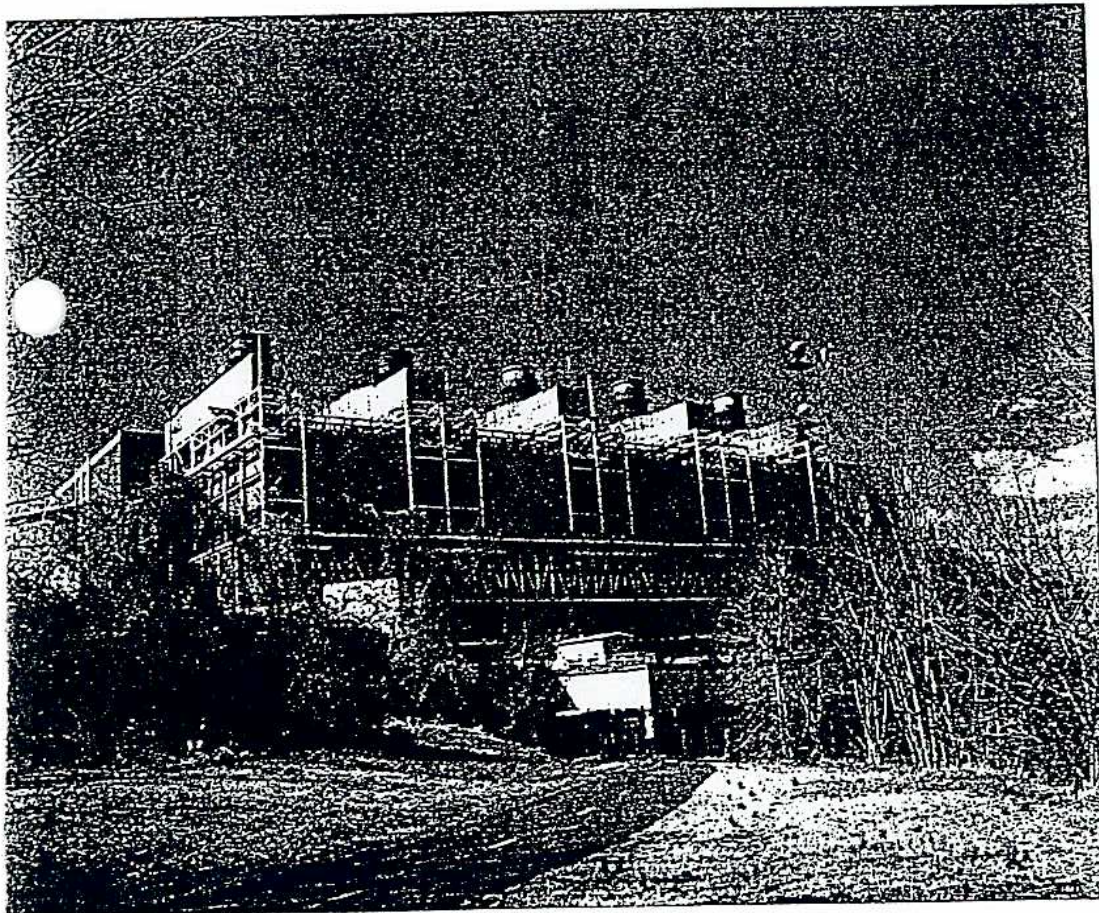


Table 1. Modeled Stack Parameters of the Potomac River Power Plant

Stack Numbers	Stack Height (m)	Stack Diameter (m)	Stack Exit Velocity (m/sec)	Stack Exit Temperature (K)
1-2	49.07	2.59	32.92	449.9
3-5	49.07	2.44	32.61	405.4

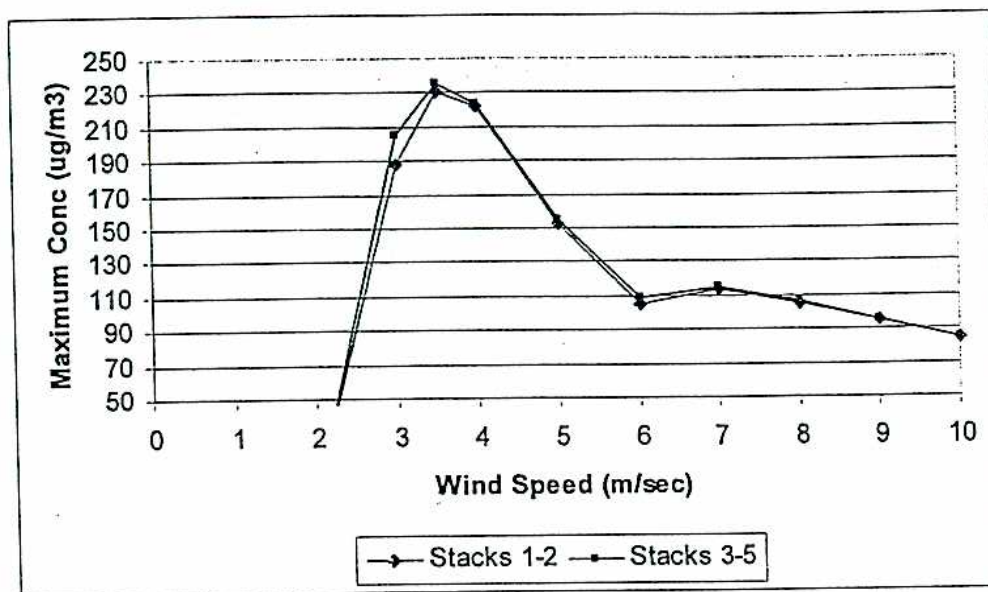
A screening-level modeling analysis was conducted consistent with standard U.S. Environmental Protection Agency's (USEPA) modeling procedures, using the USEPA SCREEN3 screening dispersion model (version 96043). This screening model allows the input of the power plant stack parameters (as specified in Table 1) as well as the power plant building height (116 feet (35.4 meters)), building length (390 feet (119 meters)), and building width (315 feet (96 meters)). The model then was set up to estimate the maximum normalized (based on a 1 gram/second emission rate for each source group) 1-hour concentrations for a receptor range of 295 feet (90 meters) to 1,640 feet (500 meters) at a "flagpole" height of 140 feet (42.6 meters) equivalent to the height of the Marina Towers condo building. Rural dispersion coefficients were used, consistent with EPA methodology. The objective of this analysis was to evaluate the likelihood for plume impaction onto the upper floors of the Marina Towers complex. Such a situation for a coal-fired power plant would have the potential to violate National Ambient Air Quality Standards and possibly create exposures to toxic air pollutants that are above acceptable health criteria. The evaluation of the significance of modeled concentrations for specific pollutants (criteria and toxic air pollutants) would need to be evaluated in the future based on a more detailed analysis.

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3.0 Results

The maximum predicted normalized 1-hour concentrations for both source groups (see Table 1) for a range of 10-meter elevation wind speeds are presented in Figure 4. The maximum predicted 1-hour concentration appears to occur with a 10-meter elevation wind speed of 3.5 m/sec (7.8 mph) for both source groups.

Figure 4. Maximum Predicted 1-Hour Normalized Concentrations for the Alexandria Power Plant in the area of the Roofline of the Marina Towers Condo Building in Relation to Wind Speed



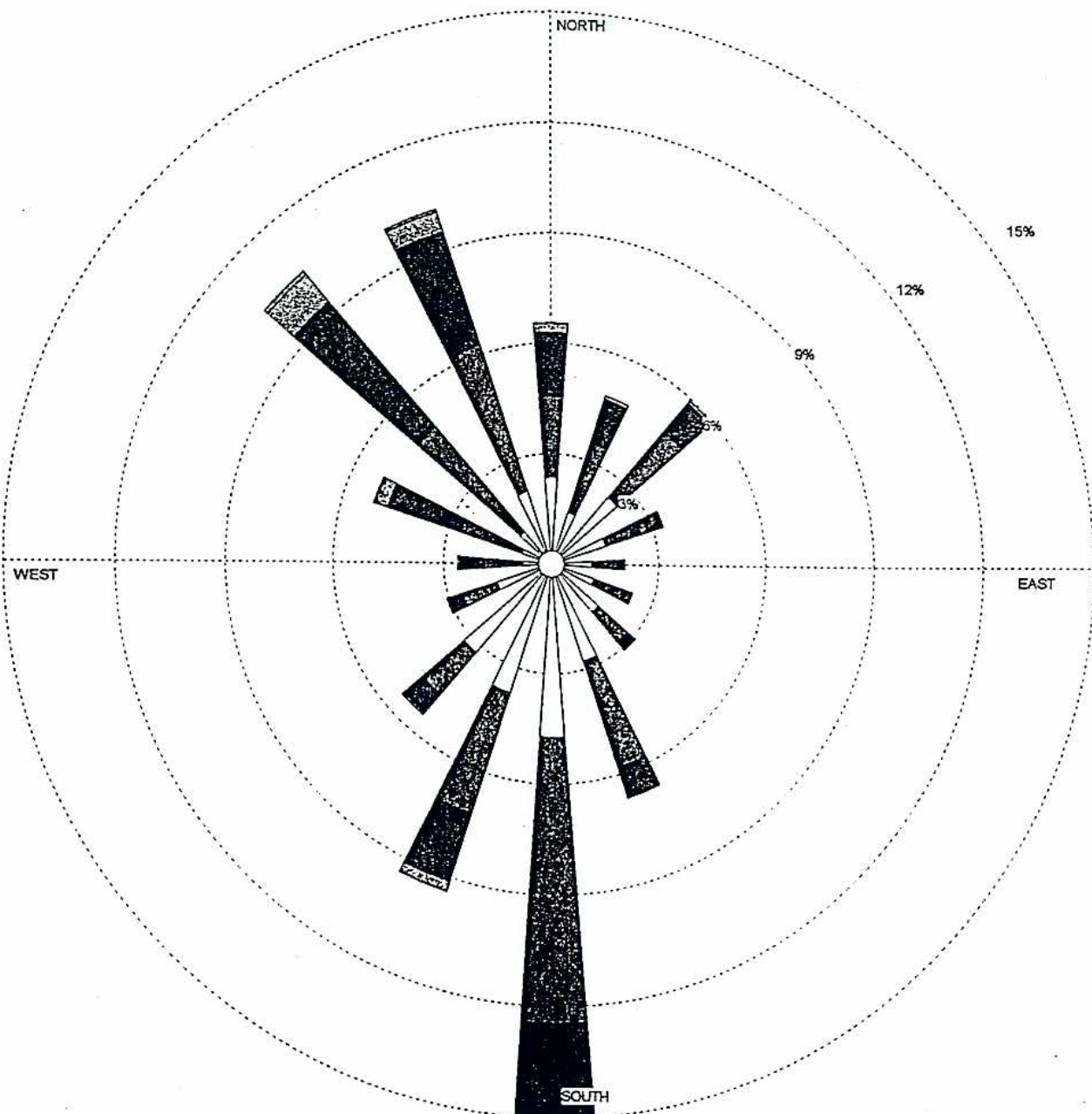
4.0 Conclusions


Based on a wind rose summary from Washington National Airport for a 10-year period (1987-1991; 1994-1998), a predominant southerly flow is evident (see Figure 5). This is also the same direction that would direct the emission plume from the power plant stacks towards the Marina Towers condo building. A further examination of the wind rose summary also shows that wind speeds in the 3.3-5.4 m/sec range from the southerly direction (SSE-S-SSW) occur about 14 percent of the time. This means that, on average, meteorological conditions associated with plume impaction conditions on the Marina Towers condominium were screened to occur as often as 1,200 hours per year.

In our judgment, further review of this potential health issue needs to be done in conformance to standard EPA modeling procedures, including evaluation of elevated receptors, to confirm that all National Ambient Air Quality Standards (NAAQS) and all air toxic guidance concentrations are being met at all receptors around this facility, including the high-rise residential areas in close proximity to the power plant.

WIND ROSE PLOT

Figure 5. Wind Rose Plot for Washington National Airport (1987-1991; 1994-1998)



Wind Speed (m/s) 	MODELER	DATE 3/29/2004	COMPANY NAME
	DISPLAY Wind Speed	UNIT m/s	COMMENTS
	AVG. WIND SPEED 4.41 m/s	CALM WINDS 2.79%	
	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 1987 1988 1989 1990 1991 1998 1997 1996 1995 1994 1 - 31Dec Jan Midnight - 11 PM	PROJECT/PLOT NO.